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# मानक

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“Knowledge is such a treasure which cannot be stolen”



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*Indian Standard*

GLOSSARY OF PETROLEUM TERMS

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## GLOSSARY OF PETROLEUM TERMS

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# *Indian Standard*

## GLOSSARY OF PETROLEUM TERMS

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 26 April 1968, after the draft finalized by the Petroleum Products Sectional Committee had been approved by the Chemical Division Council.

**0.2** This standard is intended to make available unambiguous definitions of terms used in the production, refining and trade of petroleum and petroleum products. The definitions are given in a manner so that they are understood by a user of this standard. Wherever necessary, a reference to the relevant 'P.' method of IS:1448\* prescribing the method of test is given for information.

**0.3** In this standard, terms have been arranged alphabetically throughout.

**0.4** In preparing this standard, assistance has been derived from the following publications:

IS: 334-1965 Glossary of terms relating to bitumen and tar (*revised*).  
Indian Standards Institution.

USA Standard Z11. 28: 1960 Standard definitions of terms relating to petroleum. USA Standards Institute.

SELL (G), Ed. A glossary of petroleum terms. 1961. Ed 3. The Institute of Petroleum, London.

GUTHRIE (V.B.), Ed. Petroleum products handbook. 1960. Ed 1. Mc Graw-Hill Book Co Inc, New York. Sec. 17.

**0.4.1** Due consideration has also been given to the work being done at the international level under the ISO committee ISO/TC 28 'Petroleum Products'.

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### 1. SCOPE

**1.1** This standard defines the terms used in the petroleum industry.

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\*Methods of test for petroleum and its products.

## 2. TERMINOLOGY

### A

**Absolute Dynamic Viscosity (of a Fluid)** — The force in dynes which a stationary flat plate with a surface area of  $1 \text{ cm}^2$  exerts on a similar parallel plate  $1 \text{ cm}$  away and moving in its own plane with a velocity of  $1 \text{ cm/s}$ , the space between the plates being filled with the fluid in question. It is a measure of the resistance which the fluid offers to shear. This resistance can be felt in slow stirring and observed during flow through a capillary tube. When the force is  $1 \text{ dyne}$ , the absolute dynamic viscosity of the fluid is unity, or  $1 \text{ poise}$ . For practical purposes a smaller unit, the centipoise, which equals one-hundredth of a poise, is found more convenient.

**Absolute Kinematic Viscosity (of a Fluid)** — The value obtained when the absolute dynamic viscosity is divided by the density (expressed in grams per millilitre) of the fluid at the temperature concerned. The unit of absolute kinematic viscosity is a stoke (corresponding to the poise for absolute dynamic viscosity), but for practical purposes a smaller unit, the centistoke, which equals one-hundredth of a stoke, is found more convenient.

**Absorption** — Process of extracting gasoline and light hydrocarbon gases from gaseous mixtures by passing the same through an oil which is capable of absorbing them and from which they can later be recovered.

**Absorption Oil** — Oil used to extract gasoline and light hydrocarbon gases from gaseous mixtures by absorption.

**Accelerated Ageing Test** — A procedure whereby a product may be subjected to intensified but controlled conditions of heat, pressure, radiation or other variables to produce, in a short time, the effects of long-time storage or use under normal conditions.

**Acid Clay** — A naturally-occurring clay which, after activation (usually with acid) is used mainly as a decolorant or refining agent and, sometimes, as a desulphurizer, coagulant or catalyst.

**Acidity** — See Neutralization Value.

**Acidization; Acidizing** — Treatment of an oil-bearing formation with acid to assist the flow of crude oil by improving the permeability of the reservoir rock.

**Acid Recovery Plant** — Plant for the recovery of sulphuric acid from acid sludge.

**Acid Sludge** — See Sludge.

**Acid Tar** — See Sludge.

**Additive** — A suitable substance which when added to a petroleum product confers on it special properties or enhances its natural properties.

**After Running; After Fire, Running on** — The firing of a spark-ignition engine after the ignition has been switched off.

**Aliphatic Hydrocarbons** — Group of hydrocarbons of open-chain structure, more important ones being members of the paraffin and olefin series.

**Alkylate** — Liquid product obtained from an alkylation process.

**Alkylation** — Process in which an olefin hydrocarbon is combined in the presence of a catalyst with either an *iso*-paraffin or an aromatic hydrocarbon. The process may be used in the production of high-octane gasoline.

**Ambient** — A term usually referring to surrounding conditions. Ambient temperature, for example, as used with storage tanks, is the temperature outside the tank.

**Amorphous Wax** — See Microcrystalline Wax.

**Aniline Point** — The lowest temperature at which equal volumes of aniline and of the product under test are completely miscible, under specified conditions of test (for the method of test, see P: 3 of IS: 1448).

**Anti-Knock** — A substance which, when added in very small quantities to fuels for spark-ignition engines, increases their resistance to knocking.

**Anti-Knock Value** — A measure of the resistance of a fuel to those conditions which cause explosive combustion or detonation of the fuel-air mixture in a spark-ignition engine knocking.

**API Gravity** — An arbitrary scale adopted by the American Petroleum Institute related to the specific gravity of oils as follows:

$$\text{API}^\circ = \frac{141.5}{\text{sp gr } 60^\circ\text{F}/60^\circ\text{F}} - 131.5$$

**Aromatic Hydrocarbons; Aromatics** — Group of hydrocarbons related to benzene, having good solvent properties; some of them have valuable anti-knock characteristics. Typical examples are benzene, toluene and xylene.

**Aromatization** — Process for the production of aromatic hydrocarbons from suitable feedstocks.

**Asphalt** — A natural or artificial mixture in which bitumen is associated with inert mineral matter. The word 'asphalt' should always be qualified by indication of its origin or nature.

**Asphaltenes; Hard Asphalt**—The components of the bitumen which are soluble in carbon disulphide but insoluble in paraffin naphthas, such as normal heptane.

**Asphaltic Base Crude**—Crude oil in which there is predominance of bitumen in the residue obtained by atmospheric distillation of the crude oil.

**Asphaltic Bitumen**—Term formerly used for *bitumen*.

**Asphaltic Cement**—A refined asphalt or bitumen, or blends of these with one another or with flux oils, having adhesive qualities suitable for the manufacture of road or building asphalts.

**Asphaltic Sands**—Sands impregnated with bitumen which can be extracted by a solvent.

**Autogenous Ignition Temperature**—The temperature just adequate to cause ignition of a mixture of petroleum or similar vapour and air when tested in accordance with a standard method of test.

**Auto-Ignition**—Ignition, in a spark-ignition engine, of the carburetted air without the aid of the firing mechanism.

**Avcat**—Heavy kerosine fuel for use in aircraft based on aircraft carriers.

**Average Volumetric Boiling Point**—See Mid-boiling Point.

**Avgas; Aviation Gasoline**—A specially blended gasoline suitable for use in aircraft engines, characterized by high anti-knock value, high stability, high overall volatility and low freezing point.

**Avtag**—Aviation turbine fuel of the wide-cut gasoline type.

**Avtur**—Aviation turbine fuel of the kerosine type.

## B

**Bailing**—Removal of the cuttings from a well during cable-tool drilling, or of liquid from a well by means of a bailer.

**Barrel**—A unit of measurement (volume) used for petroleum and its products.

$$\begin{aligned} 1 \text{ barrel (bbl)} &= 42 \text{ US gallons,} \\ &= 35 \text{ Imperial gallons (approx), and} \\ &= 159 \text{ litres (approx)} \end{aligned}$$

**Barrels per (Calendar) Day**—The total amount of oil, expressed in barrels, processed over a period of time divided by the number of days in that period.

**Barrels per Steam Day** — The amount of oil, expressed in barrels, processed in one day when the plant is running the whole of the time.

**Base** — Term relating to the chemical nature of crude petroleum. Crude oil may be of paraffinic, asphaltic or mixed base, according to the presence of paraffin wax, bitumen, or both, in the residue after distillation.

**Batching Oil** — Oil used to facilitate the processing of jute and other fibres.

**Baume** — A system for expressing the density of oil, obsolete in petroleum industry.

**Bean** — Removable nipple (orifice) which is inserted in the flow line of a well to control oil or gas flow.

**Benzene** — A hydrocarbon, with characteristic odour, usually obtained from by products of the carbonization of coal, but also occurring in significant proportions in certain Far-Eastern crude oils (*see also* Aromatics).

**Benzine** — Earlier term for gasoline but now obsolete. It should not be confused with *benzene*.

**Benzol** — Commercial aromatic fraction from coal tar, boiling at approximately 80°C and consisting mainly of benzene and small quantities of other aromatics.

**Benzol Recovery Oil; Benzol Wash Oil** — Oil used for removing benzol from coal gas or coke oven gas.

**Binder** — A bituminous product having properties of agglomeration.

**Bitumen** — A viscous liquid or a solid consisting essentially of hydrocarbons and their derivatives, which is soluble in carbon disulphide; it is substantially non-volatile and softens gradually when heated. It is black or brown in colour and possesses water-proofing and adhesive properties. It is obtained by refinery process from petroleum and is also found as a natural deposit or as a component of naturally occurring asphalt, in which it is associated with mineral matter.

**Black Oils** — Dark-coloured liquid petroleum products, such as heavy diesel fuel, fuel oil and some cylinder stocks.

**Bleeding** — The tendency of a liquid component to separate from a liquid, solid or semi-solid mixture, for example, oil from lubricating grease in storage.

**Blending** — The operation of intimate mixing of various components in the preparation of a product of specified properties.

**Blending Octane Value** — A measure of the capacity of a blending agent for increasing the octane number of a base stock. This value varies with the nature and proportions of the components.

**Block Grease; Brick Grease**—A grease of high melting point which, under normal temperatures, can be handled in block or stick form. It is used for journal bearings, and melts slowly under high temperature.

**Bloom**—The colour of fluorescent light exhibited by some oils when viewed by reflected light. This usually differs from the colour as seen by transmitted light. Many petroleum oils which appear red or yellow by transmitted light exhibit a blue or green bloom.

**Blown Bitumen**—Special type of bitumen produced by blowing air through hot bitumen.

**Blown Oil**—Vegetable or animal oil oxidized by heating and blowing with air, particularly to increase its viscosity. It is used as an additive in compounded oil.

**Blow Out**—A sudden violent escape of gas and oil from a drilling well when high pressure is encountered.

**Boiling Range**—See Distillation Range.

**Bottled Gas**—Liquefied petroleum gas stored under pressure in suitable containers.

**Bottom-Hole Pressure**—Pressure measured in a well opposite the producing formation. If the well is flowing the *flowing bottom-hole pressure* will be obtained; if the well is not and has not been producing for a sufficient time, the pressure will be the *full-built up* or *static bottom-hole pressure*.

**Bottoms**—The residue remaining at the bottom of a still after distillation.

or

The layer left in a tank or similar container after draining to the level of the pump's suction.

**Bottom Settlings and Water**—It comprises any solids and aqueous solutions present in a crude oil or fuel oil, which either settle out on standing or may be separated more rapidly by a centrifuge (for method of test, see P:41 of IS: 1448).

**Boundary Lubrication**—The state of lubrication when two surfaces moving in relation to each other are only partially separated by an oil film.

**Break Point**—The point on the pressure-time curve that is preceded by a pressure drop of exactly  $0.15 \text{ kg/cm}^2$  in 15 minutes and succeeded by a drop of not less than  $0.15 \text{ kg/cm}^2$  in 15 minutes.

**Breathing**—Movement of gas, oil vapour and/or oil in and out of storage tanks due to alternate heating and cooling, and receiving and discharging of product.

**Brick Grease** — *See* Block Grease.

**Brick Oil** — Oil used in the moulding or pressing of bricks.

**Bright Stock** — Lubricating oil of high viscosity prepared from a cylinder stock by further refining processes, such as solvent extraction, dewaxing, treatment with acid or acid clay, or some combination of these. They are used for compounding motor oils.

**Bromine Number** — The weight, in grams, of bromine, which will combine under prescribed conditions with 100 g of the petroleum product under test (for method of test, *see* P: 43 or P: 44 of IS: 1448). It is used as an indication of the degree of unsaturation.

**Bubble Cap** — Inverted cup with a notched or slotted periphery to disperse the vapour in small bubbles beneath the surface of the liquid on a bubble tray in a distillation column.

**Bubble Tray** — Horizontal tray fitted to the inside of a distillation column to secure intimate contact between rising vapours and falling liquid in the column.

**Bund** — Earthwork or wall surrounding-storage tanks to retain the contents in the event of a fracture of the tanks.

**Bunker Fuel** — Fuel oil taken into the bunkers of ships.

**Burning Oil** — *See* Kerosine and Long-Time Burning Oil.

**Burning Quality Index** — An empirical numerical indication of the likely burning performance of a furnace or heater oil, determined from certain ASTM distillation points and API Gravity and generally recognizing the factors of paraffinicity and volatility.

**Butanes; Normal Butane, isoButane** — Two gaseous saturated hydrocarbons containing four carbon atoms. They are used as constituents of gasoline to improve volatility and anti-knock value, for heating purpose and as raw materials in certain synthetic processes.

## C

**Cable Compound** — A mixture of mineral oil and a thickener (petrolatum, resins, polymers, etc) intended for the impregnation of the insulation of electric cables.

**Cable Oil** — Petroleum oil suitable for use, either alone or with other materials, as a dielectric in power-carrying cables.

**Calcined Coke** — The product resulting from controlled heat treatment of raw petroleum coke, which involves temperatures in excess of 1000°C and achieves devolatilization and simultaneous densification of the petroleum coke particles.

**Calibration Table**—A table showing the capacities of (or volumes in) a container corresponding to various liquid levels measured from the dipping datum point, or from the ullage reference point.

**Caliper Log**—Continuous record of the variations in mean diameter or in cross-sectional area of a bore-hole with depth.

**Calorific Value; Heat of Combustion; Thermal Value**—The amount of heat liberated by the combustion of unit mass of a substance under specified conditions (for methods of test, *see* P: 6 and P: 7 of IS: 1448). The gross calorific value is the sum of the heat produced by the total combustion of the substance and the heat released by the condensation of the water vapour formed by such combustion. The net calorific value is the gross value minus the heat released by the condensation of the water vapour formed by the combustion.

**Capacitor Oil**—Petroleum product suitable for use as a dielectric in a capacitor (condenser).

**Cap Rock**—Impervious rock which overlies an oil or gas accumulation, and which prevents the escape of hydrocarbons from the accumulation.

or

Highly porous and permeable rock, commonly consisting of calcium carbonate, with gypsum, anhydrite, and sometimes sulphur, on top of some salt domes. This salt dome cap rock can serve as an oil reservoir rock.

**Carbon Black; Furnace Black**—Substantially pure finely-divided carbon, usually produced from gaseous and liquid hydrocarbons by controlled combustion with restricted air supply so as to obtain incomplete combustion.

**Carbon Residue**—Residue formed during pyrolysis of an oil carried out according to a standard method of test (for method of test, *see* P: 8 of IS: 1448).

**Casing**—Steel lining of a well, used to prevent caving of the sides of the well to exclude unwanted fluids, and to provide means for the control of well pressures and oil and gas production.

**Casinghead Gas**—*See* Natural Gas.

**Casinghead Gasoline**—*See* Natural Gasoline

**Casing Pressure**—Pressure built up in the space between the casing and the tubing when it is sealed off at the top of a well.

**Catalytic Cracking**—A refinery process whereby the relative proportions of lighter or more volatile products obtainable from an oil may be increased by bringing about changes in the chemical structure of the constituent hydrocarbons in presence of a catalyst.

**Catalytic Reforming**—A catalytic process to improve the anti-knock quality of low-grade naphthas and virgin gasolines by the conversion of naphthenes (such as cyclo-hexane) and paraffins into higher octane aromatics (such as benzene, toluene and xylene).

**Ceresin**—Refined ozokerite; the commercial product is nearly always admixed with petroleum wax.

**Cetane Number**—Number on a conventional scale, indicating the ignition quality of a diesel fuel under standard test conditions. It is expressed as the percentage by volume of cetane in a mixture of cetane and of  $\alpha$ -methyl naphthalene having the same ignition delay period as the fuel under test (for method of test, *see* P:9 of IS: 1448).

**CFR Engine**—Generic term for a series of standardized engines developed by the Co-operative Fuel Research Committee of USA for the determination of engine behaviour of fuels.

**Channel Black**—Carbon black produced (usually from natural gas) by a particular method called the channel method.

**Chassis Lubricant**—Lubricating greases of a consistency which requires it to be applied with grease guns through fittings on automotive, farm, and industrial equipment.

**Choke**—*See* Bean.

**Christmas Tree**—Assembly of valves and fittings located at the head of a well to control the flow of oil and gas.

**Cloud Point**—The temperature at which a cloud or haze begins to appear when an oil, which has been previously dried, is cooled under prescribed conditions. Such cloud or haze is usually due to the separation of paraffin wax (for method of test, *see* P:10 of IS: 1448).

**Coking**—A process of cracking petroleum products to produce coke and other petroleum products.

*or*

Undesirable accumulation of carbon (coke) deposits in refinery plant or in internal combustion engines.

**Cold Point**—*See* Cold Test Temperature.

**Cold Settling**—Process for removing petroleum wax from cylinder stock and high viscosity distillate by chilling a naphtha solution of the oil and allowing the wax to crystallize out of the solution and settle to the bottom of the pans.

**Cold Test Temperature; Cold Point**—The temperature at which the crystals of solid hydrocarbons made just visible by chilling disappear when

the temperature is allowed to rise gradually under specified conditions. This test is normally applied to light distillates, such as gasoline.

**Combination Cracking** — Process involving crude oil distillation, vis-breaking, naphtha reforming and gas oil cracking.

**Combustion Shock** — Abnormal burning of fuel in an internal-combustion engine. In a gasoline engine, it is due to either preignition or detonation of the fuel-air mixture. In a diesel engine, it results from the uncontrolled burning of fuel accumulated in the combustion chamber prior to autoignition.

**Compensating Reference Point** — A movable cursor capable of remaining at a fixed distance from the tank bottom irrespective of movement of gauging apparatus.

**Compounding** — The operation of blending vegetable or mineral oils or other additives with mineral oil in order to confer qualities necessary for particular applications.

**Compression Gasoline** — A liquid petroleum product of low initial boiling point obtained by compressing and chilling natural or refinery gas.

**Concrete Mould Oil** — *See* Form Oil.

**Condensate** — A liquid (phase) obtained by cooling or compressing a vapour (phase).

**Condensate Field; Distillate Field** — Petroleum accumulation in which a high proportion of the hydrocarbons, even those of comparatively high molecular weight, is in the vapour state, the system being under a pressure and temperature such as to make it liable to retrograde condensation.

**Coning** — Local distortion of an oil/water contact or a gas/oil contact into a conical form as a result of oil flow into a well. The apex of the cone is on the axial line of the well, and it points upwards for an oil/water contact and downwards for a gas/oil contact. In extreme cases, water or free gas will enter the well with the oil as a result of coning.

**Connate Water** — Water enclosed in the pores of a sedimentary rock at the time that the rock was formed. The term has also been applied to interstitial water.

**Conradson Carbon Residue** — Carbon residue determined by the Conradson method of test.

**Conventional Tank** — A vertical cylindrical tank with a fixed roof commonly employed in the petroleum industry and which is not constructed to withstand any appreciable pressure or vacuum in the vapour space. It may, therefore, be gauged directly through an open hatch.

**Co-Polymerization** — *See* Polymerization.

**Co-Polymers** — *See* Polymerization.

**Copper Strip Corrosion Test** — Test intended to detect corrosive products, particularly of sulphur, and to estimate their degree of corrosiveness according to changes in the appearance of a strip of electrolytic copper after it has been immersed in the sample for test under specified conditions (for method of test, *see* P:15 of IS:1448).

**Core** — Cylindrical rock sample taken by means of an annular cutter.

**Core Oil** — Oil used for the binding of sand in the preparation of foundry cores.

**Corrosive Sulphur** — Sulphur and compounds of sulphur, present in petroleum products, which attack copper.

**Cracked Distillate** — Distillate obtained at the end of a cracking operation.

**Cracked Gasoline** — Gasoline obtained by cracking.

**Cracking** — Transformation of hydrocarbons under the influence of heat, characterized essentially by a change in their chemical structure resulting in an increase in the relative proportions of lighter or more volatile components.

**Crankcase Oil** — Lubricating oil used in the crankcase of an internal combustion engine.

**Cresol** — A yellowish liquid recovered from cracked naphthas and gas oils. It is used in manufacturing plastics, insecticides, etc.

**Crude, Asphaltic Base** — *See* Asphaltic Base Crude.

**Crude, Mixed Base** — *See* Mixed Base Crude.

**Crude, Naphthenic Base** — *See* Naphthenic Base Crude.

**Crude Oil** — Naturally-occurring mineral oil (before refining or other treatment), consisting essentially of hydrocarbons. Crude oil may be of paraffinic, asphaltic or mixed base, according to the presence of paraffin wax, bitumen, or both paraffin wax and bitumen in the residue after atmospheric distillation.

**Crude, Paraffinic Base** — *See* Paraffinic Base Crude.

**Cup Grease** — A lubricating grease, usually lime base, originally used only in the compression cups. It is now made in a number of consistency grades for many applications.

**Cut Back** — Bitumen the viscosity of which has been reduced by the addition of a volatile diluent.

**Cut Fraction** — Fraction obtained by distillation between any two fixed temperatures.

**Cutting Fluid** — Fluid used in machining operations mainly for lubricating and cooling the cutting tool, and also for flushing swarf from the work.

**Cutting Oil Soluble** — *See* Soluble Oil.

**Cutting Oil, Straight** — Petroleum oil, fatty oil, sulphurized oil, or mixtures of these, sometimes containing additives, such as sulphur, chlorine, or phosphorus compound (*see also* Cutting Fluid).

**Cyclization** — Process of changing an open-chain hydrocarbon structure to a closed ring.

**Cylinder Oil** — Lubricating oil of high viscosity primarily used for the lubrication of the cylinders and valves of steam engines.

**Cylinder Stock** — Dark-coloured lubricating oil of high viscosity usually obtained as a residue of distillation and used as the basis of steam cylinder oil.

## D

**Datum Plate** — A level metal plate attached to the tank bottom or shell to provide a smooth surface for the dip weight to rest upon.

**Deadwood** — Fittings inside a tank that would otherwise be occupied by the product.

**Deasphalting** — Solvent-refining whereby the asphaltic constituents are precipitated and separated from certain petroleum fractions.

**Debutanization** — Distillation process for the removal of butane and lighter components from a petroleum product.

**Dehydrogenation** — Process for the removal of hydrogen from a chemical compound, for example, the removal of two hydrogen atoms from butane to make butylene (butene), and further removal of hydrogen to make butadiene.

**Delay Angle** — The interval, measured in degrees of crankshaft rotation, between the beginning of lift of the fuel-injection valve and the sudden rise of pressure in the cylinder which marks the beginning of combustion in a compression-ignition engine. This interval depends on the ignition quality of the fuel.

**Demulsibility Test** — Test intended to measure the ability of an emulsion of oil and water to separate into its two constituents under prescribed conditions.

**Demulsification Number** — A measure of the ability of an oil to separate from an oil-water emulsion. It is intended for application to oils which, in service, are liable to be emulsified with water condensed from steam.

**Density** — The density of a substance at a specified temperature is its mass per unit volume at that particular temperature.

**Desalting** — Removal of water-soluble salts from crude oil.

**Desulphurization** — Process for removing sulphur or sulphur compounds from a petroleum oil.

**Detergent Additives** — Compounds which, when blended with lubricating oils, hold in suspension the deterioration products from the fuel and lubricants and thus minimize the formation of deposits liable to cause piston-ring sticking or other trouble.

**Detergent Oil** — Lubricating oil, particularly used in internal-combustion engines, having the property of maintaining in suspension products of deterioration which may be formed during use. This property results from the presence of suitable additives.

**Detonation** — In a gasoline engine, the phenomenon occurring when the last portion of the fuel-air mixture ignites spontaneously instead of burning in a normal manner. It occurs simultaneously with the end of combustion when the flame front is found to compress the charge which leads to autoignition because of development of high-velocity percussion waves in the chemical reaction zone. The result is a pinking noise.

**Dewaxing** — The operation of removing wax from a mineral oil.

**Diesel Engine Road Vehicle (DERV) Fuel** — A gas oil suitable for use as fuel for high-speed compression ignition-engines.

**Diesel Fuel** — Oil used as fuel in diesel and other compression-ignition engines.

**Diesel Index** — Number indicating the ignition quality of a fuel in a diesel engine. It is calculated from the specific gravity and the aniline point of the fuel (for method of test, see P: 17 of IS: 1448).

**Dip Innage** — The total depth of liquid in container, measured directly by means of the graduated dip-tape and dip-weight or by a graduated rod, reaching the dipping datum point at the bottom of the container.

**Dipping Datum Point** — The reference point on the base of a tank from which height within the tank are measured.

**Dipping Reference Point** — A point clearly marked on the dip hatch directly above the dipping datum point to indicate the position of the tape when dipping. The exact height of the dipping reference point above the

**datum plate** shall be clearly marked on the roof of the tank near the dip hatch.

**Dip Pipe**—An open-ended pipe attached by a vapour-tight joint to a vapour-tight container. The pipe projects downwards, ending near the bottom of the tank, directly above the datum plate.

**Dip Point**—*See* Dipping Datum Point.

**Dissolved Gas Drive**—*See* Solution Gas Drive.

**Distillate**—Liquid obtained by condensing the vapours formed by the distillation of a petroleum product.

**Distillate Field**—*See* Condensate Field.

**Distillation Range; Boiling Range**—The temperature range which characterizes a fraction by its initial and final boiling points.

**Disulphides**—Group of sulphur compounds having a relatively pleasant odour which occur naturally in petroleum and which are also formed from mercaptans in the sweetening process.

**Doctor Test**—Test for detecting certain corrosive compounds of sulphur, such as hydrogen sulphide and mercaptans, in colourless or slightly-coloured petroleum products, by the action of these compounds on sodium plumbite in the presence of flowers of sulphur (for method of test, *see* P : 19 of IS : 1448).

**Doctor Treatment**—Sweetening process used for light gas in which sodium plumbite and some sulphur are employed to oxidize mercaptans to disulphide.

**Draw-Down**—The difference between the static and the flowing bottom-hole pressures.

**Drawing Compound**—Lubricant for the die used in metal drawing of wire, rods and tubes.

**Drift**—The horizontal distance by which a non-vertical well is deflected at depth from the point vertically below the top of the well.

**Drill Collar**—Heavy thick-walled drill pipe fitted immediately above the bit in rotary drilling.

**Drilling Mud**—Fluid, consisting mainly of clay suspended in water, circulated through the drilling bit in the rotary method of drilling of wells.

**Drill Pipe**—Steel pipe used for carrying and rotating the drilling tools in a well and for permitting the circulation of the drilling mud.

**Drill Stem Testing; Formation Testing**—Method of testing a suspected fluid-bearing formation by allowing fluid from that formation to flow into the drill pipe.

**Drop Point** — Temperature at which a grease changes from the semi-solid to the liquid state. It is normally determined by measuring the temperature at which a drop of grease or other petroleum product first detaches itself from the main bulk of material when a sample is steadily heated under the prescribed conditions ( *see* P: 52 of IS: 1448 ).

**Dry Gas** — *See* Natural Gas.

**Drying Oil** — Oil possessing the property of readily absorbing oxygen from the air to form a relatively hard, tough and elastic film.

**Dry Point** — Temperature at the time of vaporization of the last drop of liquid at the bottom of the distillation flask during a standard distillation test ( for method of test, *see* P: 18 of IS: 1448 ).

**Dual Completion** — Well in which production can be taken separately and simultaneously from two reservoir rocks.

**Ductility of Bituminous Material** — The property which enables it to be mechanically deformed when cold without becoming progressively more resistant to deformation. It is measured by the distance ( in centimetres ) to which it will elongate before breaking when two ends of a briquette specimen of the material of the specified form are pulled apart at a specified speed and temperature.

**Dynamic Viscosity** — *See* Absolute Dynamic Viscosity.

## E

**Earth Wax** — *See* Ozokerite.

**Edeleanu Process** — Refining of oil by means of the selective solvent action of liquid sulphur dioxide.

**Edge-Water** — Water underlying and marginal to oil and/or gas accumulations in a reservoir rock.

**Effective Permeability** — *See* Permeability.

**Electric Logging** — Technique, originally derived by Schlumberger, in which a series of electrodes are traversed up a bore hole and electric measurements are recorded at the surface in the form of graphs known as electric logs. These logs are used for purpose of geological correlation, recognition of some rock properties and, under favourable circumstances, for the indication of fluids present in the pores of the rock.

**Emulsibility** — The ability of a petroleum product to form an emulsion with water.

**Emulsified Bitumen** — An emulsion of bitumen in an aqueous phase containing a surface active agent.

**End-Point; Final Boiling Point** — Maximum temperature noted during a distillation test carried out according to a standard method of test (for method of test, *see* P: 18 of IS: 1448).

**Engine Distillate** — A refined or unrefined petroleum distillate similar to naphtha, but often of higher distillation range.

**Engine Oil** — Lubricating oil used in internal-combustion engines.

**Engine Sludge** — *See* Sludge.

**Equivalent Dip** — The depth of liquid in a container corresponding to a given ullage. It is obtained by subtracting the observed ullage from the height of the ullage reference point.

**Ethyl Fluid** — Proprietary name for a brand of anti-knock compound containing tetraethyl lead as the active constituent.

**Existant Gum** — Residue obtained by the evaporation of a fuel under standard conditions of test.

**Exotic Fuels** — A term, credited to the American Rocket Society, for the high energy liquid and solid fuels, petroleum, chemical or combinations, used for propellants for rockets, missiles and space satellites.

**Explosive Limits** — The limit of percentage composition of mixtures of gases and air (or oxygen) within which an explosion takes place when the mixture is ignited.

**Extract** — Substance(s), separated from petroleum products by the selective action of a solvent in solvent-extraction processes other than dewaxing. Extracts are generally aromatic in character (*see also* Raffinate).

**Extraction Naphtha** — A grade of naphtha suitable for extraction purposes.

**Extreme Pressure (EP) Lubricant** — Lubricating oil or grease containing additives to increase its film strength.

## F

**False Brinelling** — The removal of very finely-divided particles from bearing surfaces due to inherent adhesive forces which are assisted by vibrating motion. The finely-divided wear particles are then usually oxidized to a corrosion product.

**Fatty Acids** — Group of organic acids existing in the free state or combined in fats. Well-known examples are oleic, palmitic and stearic acids.

**Feedstock** — Primary material introduced into a plant for processing.

**Fibre** — The form in which the soap thickeners occur in lubricating greases, the soaps crystallizing in threads with their lengths of the order of

20 or more times their thicknesses. Most soap fibres are microscopic in size so that the grease appears smooth to the eye.

**Fibril**—An extremely small fibre, usually barely visible even at the maximum magnification of the electron microscope. Fibrils may collect in bundles to form larger fibres.

**Filler**—Finely-divided inert powder added to bitumens and lubricating greases for the purpose of modifying their physical properties (for their determination in greases, *see* P: 58 of IS: 1448).

**Filter Cake**—Compacted solid or semi-solid material separated from a liquid, and remaining on a filter after pressure filtration.

*or*

Layer of concentrated solids from the drilling mud left behind on the walls of a bore-hole, or on a filter paper in filtration tests on drilling mud.

**Final Boiling Point (FBP)**—*See* End-Point.

**Fire Point**—The lowest temperature at which a petroleum product takes fire and burns continuously when a small flame is applied to its surface under prescribed conditions (*see* P: 66\* or P: 69\* of IS: 1448).

**Fishing**—Operation for the recovery of lost tools or drilling equipment from a well.

**Flash Distillation**—A type of distillation process in which the feed-stock is introduced into a vessel (column or flash drum) under conditions of temperature and pressure such that the lighter components are removed quickly from the heavier residue.

**Flash Point**—The lowest temperature at which the vapours emitted by a product ignite momentarily in the presence of a flame, when operating according to a specified test method (for method of test, *see* P: 20, P: 21, P: 66\* or P: 69\* of IS: 1448).

**Floating Roof Tank**—A tank in which the roof floats upon the surface of the liquid contents except at low levels when the weight of the roof is taken on supports on the tank bottom, thereby eliminating tank breathing and reducing evaporation.

**Float Test**—A method for determining the consistency of bituminous materials.

**Flowing by Heads**—Natural oil flow from a well which is intermittent or in surges.

**Fluid Contact**—*See* Gas/Oil Contact and Oil/Water Contact.

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\*Under preparation.

**Fluid Lubrication** — The state of lubrication when two surfaces moving in relation to each other are completely separated by an oil film.

**Flushing Oil** — Oil used to remove oil, decomposition products, and dirt from lubrication systems.

**Fluxed Bitumen** — Bitumen softened by the addition of an oil of relatively low volatility.

**Flux Oil** — A substantially non-volatile oil used for reducing viscosity of bituminous material.

**Formation Factor** — *See* Formation Resistivity Factor.

**Formation Fracturing; Hydraulic Fracturing** — Technique to open up cracks in an oil reservoir rock, which involves the application of high hydraulic pressure and the injection of a propping agent, such as sand, into these cracks. The fractures increase the overall permeability of the rock.

**Formation Resistivity Factor; Formation Factor** — The ratio of the resistivity of the saturated rock to the resistivity of the saturating water in a completely water-saturated clean rock.

**Formation Testing** — *See* Drill Stem Testing.

**Formation-Volume Factor** — The ratio of the volume of oil with gas in solution under subsurface conditions to the volume of the same oil, when gas-free, under standard surface conditions.

*or*

The ratio of the volume of a mass of free gas under reservoir conditions to its volume under standard surface conditions.

**Form Oil; Mould Oil** — Oil or emulsion used to minimize the sticking of concrete to moulds.

**Fraction** — *See* Cut.

**Fractionation; Fractional Distillation** — Distillation process in which the distillate is collected as a number of separate fractions each having a different boiling range.

**Free Sulphur** — Uncombined (chemically) sulphur occurring in crude oil and petroleum products.

**Free Water** — The water which has separated out of the material and settled down at the bottom of the tank and which, on gauging, cuts or discolours the water-finding paste or paper across the whole width of the water-finding rule or tape in horizontal line.

**Freezing Point** — The temperature at which a liquid solidifies under normal atmospheric pressure. This term should not be used for 'Cold Test Temperature' (for method of test, *see* P: 11 of IS: 1448).

**Frozen Pipe** — Pipe held immovable in a well by cavings which have settled around it.

**Fuel Oil** — Heavy distillates, residues, or blends of these, used as fuel for the production of heat or power; also called *liquid fuel*.

**Fuller's Earth** — A clay having a high natural absorption capacity, used in refineries to filter and decolorize oils.

**Furnace Black** — *See* Carbon Black.

## G

**Gamma Ray Log** — Strip recording of the intensity of natural radio-activity versus depth, obtained when a suitable detector is moved through a bore-hole.

**Gas Freeing** — Operation of removing flammable gas from a storage tank or vessel.

**Gas Injection; Gas Lift** — Injection of gas into a producing well at a low point to supplement the natural energy in order to increase the rate of oil flow. If the gas is injected only to make up reservoir pressure, it is known as *Gas Injection*.

**Gas Oil** — A petroleum distillate having a viscosity and distillation range intermediate between those of kerosine and light lubricating oil. It is used as a fuel for high-speed diesel engines, as a burner fuel in heating installations, and for enriching water gas (*see also* DERV Fuel).

**Gas/Oil Contact** — The gas/oil contact in a reservoir rock is considered to occur at the level above which slow production gives only gas.

**Gas: Oil Ratio (GOR)** — The ratio of the rates of output of gas and oil, both measured under standard conditions. In USA and over much of the rest of the world, the figure is given as cubic feet of gas per US barrel of gas-free oil; in some countries the unit is the cubic metre for both gas and oil. The 'dissolved gas: oil ratio' refers to the oil with its dissolved gas under reservoir conditions or under other stated conditions of temperature and pressure.

**Gasoline** — Petroleum distillate, generally boiling around the range 30° to 215°C; it is primarily intended for use as a fuel in spark-ignition internal-combustion engines. Other terms in general use for gasoline are *petrol*, *motor spirit* and *motor gasoline*.

**Gear Oil** — Oil suitable for the lubrication of gears.

**Girbitol Process** — A process for removing hydrogen sulphide, carbon dioxide and/or organic gases from petroleum gases and liquids.

**Go-Devil** — Scraper with self-adjusting spring blades which is pumped through a pipeline to clear away accumulations.

or

Weight or small explosive charge dropped to explode a charge of nitroglycerine placed at the bottom of a well.

or

Weight dropped down the drill pipe in order to open a valve in drill-stem testing.

**Graphite Grease** — A moderately soft grease containing a suspension of graphite particles suitable for such applications as leaf springs, mechanical brake cables, speedometer cables and mechanical fuel pumps.

**Grease** — A solid to semi-liquid product of a dispersion of a thickening agent in a liquid lubricant usually mineral oil; but can be of any type of recognized lubricant, such as a synthetic oil or fatty oil with or without fillers and additives.

**Green Acids** — Water-soluble petroleum sulphonic acids.

**Gum** — The dark-coloured residue which may remain, in small quantities, when all the volatile constituents of certain types of motor fuels have been evaporated under prescribed conditions. *Existant gum* is that already present in the fuel and *potential gum* is that which may be formed during prolonged storage or produced by accelerated ageing (for method of test, see P:28 of IS: 1448).

**Gum-Forming Tendency** — The chemical instability of certain hydrocarbons leading to the formation of gum.

**Gun Perforator** — Device used to perforate casing and cement in a well by shooting steel bullets or shaped charges through them.

## H

**Hard Asphalt** — Alternative term for *asphaltenes*.

**HD Oil** — See Heavy Duty Oil.

**Heart Cut** — In refining, a narrow boiling range fraction, usually taken near the middle portion of the stock being processed.

**Heat of Combustion** — See Calorific Value.

**Heat Transfer Oil** — Mineral oil used for the indirect transfer of heat.

**Heat Treatment Oil** — See Quenching Oil and Tempering Oil.

**Heavy Duty (HD) Oil** — Lubricating oil for use in certain types of high-speed diesel engines and spark-ignition engines subject to high piston and crankcase temperatures. It normally contains special additives to increase detergency and resistance to oxidation and to minimize corrosive action.

**Heavy Ends** — That portion of a product being distilled, which is of appreciably higher boiling point than the rest of the product.

**Hortonsphere** — A patented spherical tank used in the storage of oils of high volatility under pressure.

**Hydraulic Fluid** — Fluid used for transmitting power in a hydraulic system. It may be of petroleum or other origin.

**Hydraulic Fracturing** — See Formation Fracturing.

**Hydrocracking** — See Hydrogenation.

**Hydrodesulphurization** — Process for the removal of sulphur from petroleum products by treatment with hydrogen in the presence of a catalyst.

**Hydrofining** — A process of treating petroleum fractions in the presence of catalysts and hydrogen, to upgrade their quality.

**Hydroforming** — Process for the conversion or reforming of light petroleum fractions of low-octane rating into those of high-octane rating by treating with an excess of hydrogen in the presence of a catalyst.

**Hydrogenation** — Chemical addition of hydrogen to unsaturated compounds, as in the preparation of octanes from the corresponding unsaturated hydrocarbons produced by polymerization.

or

Treatment of oil or coal with hydrogen at high temperatures and pressures, whereby cracking and other reactions occur, in addition to true hydrogenation. This type of treatment is also termed *destructive hydrogenation* or *hydrocracking*.

**Hydrometer** — A graduated instrument with an internal float for determining the gravity of petroleum and other liquids. The instruments used in measuring the gravity of petroleum oils usually read API degrees or specific gravity directly.

**Hypoid Lubricant** — An extreme pressure lubricant designed for use with hypoid gears.

## I

**Ice-Machine Oil** — See Refrigerator Oil.

**Ignition Accelerator; Ignition Promoter** — Additive which improves the ignition quality of diesel fuel.

**Ignition Quality** — Measure of the ease with which a diesel fuel ignites. It is normally expressed in terms of Cetane Number or Diesel Index.

**Illuminating Oil** — Oil suitable for use in wick-fed or mantle type lamps. The term includes kerosine, long-time burning oil, mineral colza, mineral seal, and signal oil.

**Induction Period** — The period of time before a break in stability occurs when a gasoline is submitted to a standard method of test.

**Inhibitor** — A substance naturally occurring or added (*see* Additive), whose presence in small amounts in a petroleum product prevents or retards the occurrence of certain phenomena considered undesirable.

**Initial Boiling Point** — Temperature at the moment when the first drop of condensate falls from the tip of the condenser during a standard distillation test (for method of test, *see* P: 18 of IS: 1448).

**Injection Well** — *See* Input Well.

**Innage** — *See* Dip.

**Input Well; Injection Well** — Well used for injecting fluids into an underground stratum.

**Instantaneous Vaporization** — Partial or total vaporization obtained by sudden reduction of pressure.

**Insulating Oil** — Low-viscosity oil of high-dielectric strength used in electrical equipment for insulation and as a cooling agent.

**Interfacial Tension** — The force measured in dynes per centimetre with which the interface between two non-miscible liquids, such as oil and water resists enlargement of its area.

**Interstitial Water** — Water present in the pores in the oil (or gas) bearing zone of a reservoir rock.

**Invaded Zone** — The zone in a permeable rock around a well bore into which filtrate (normally water) from the drilling mud has passed, with the consequent partial or total displacement of the fluids originally present in that zone.

**Iodine Value** — Amount of iodine absorbed by a petroleum product, under prescribed conditions, indicating the degree of unsaturation.

**Irreducible Minimum Saturation** — The proportion of the pore space occupied by immobile interstitial water at levels well above the oil/water or gas/water transition zones.

**isoButane** — *See* Butanes.

**Isomate** — Liquid product obtained by isomerization of a straight-run gasoline.

**Isomerization** — Conversion of a compound into another containing the same atoms in the molecule but arranged in a different way. In the petroleum industry, this process is employed for converting straight-chain hydrocarbons into branched-chain hydrocarbons.

**isoOctane** — The hydrocarbon 2, 2, 4-tri-methyl pentane, a colourless liquid, given an octane value of 100 by definition.

## J

**Jet Fuel** — Originally petroleum distillates used as a source of energy in systems of jet propulsion; by extension, fuel suitable for use in gas turbines.

**Journal Oil** — Lubricating oil used for the lubrication of the moving parts of machines functioning without substantial rise of temperature.

## K

**Kauri-Butanol Value** — Measure of the dissolving power of a solvent for resins, based on natural kauri gum as the standard resin (for method of test, see P : 24 of IS : 1448).

**Kerosine** — Refined petroleum distillate intermediate in volatility between gasoline and gas oil. Its distillation range normally falls within the limits of 150° and 300°C. Its main uses are for lighting and heating, and as a fuel for certain types of internal-combustion engines. In the United Kingdom it is also known as *paraffin* or *paraffin oil* (see also Power Kerosine).

**Kinematic Viscosity** — See Absolute Kinematic Viscosity.

**Knocking** — In a diesel engine, the phenomenon occurring simultaneous with the beginning of combustion when spontaneous with the change, the fuel accumulated during the ignition delay period ignites because of higher rates of pressure rise that is normally expected. The result is observed as a metallic knock.

**Knock Rating** — See Octane Number.

## L

**Lacquer** — Hard, lustrous, varnish-like, oil-insoluble substance deposited on the pistons and in the cylinder of internal-combustion engines.

**Lamp Oil** — Refined petroleum distillate, generally intended for lighting and heating.

**Lenticular Sands** — See Shoe-String Sand.

**Lead Scavenger** — An organic halide, such as ethylene dibromide, incorporated in ethyl fluid to assist in the removal of lead oxide from the combustion space of gasoline engines.

**Lead Susceptibility** — The response of gasoline to the addition of tetraethyl lead as reflected by the increase in anti-knock quality.

**Light Distillate** — General term for a distillate with a final-boiling point not exceeding 300°C.

**Light Ends** — That portion of a product being distilled which is of appreciably lower boiling point than the rest of the product.

**Ligroine** — A fraction containing saturated hydrocarbons boiling in the range 20 to 130°C and suitable for general laboratory use.

**Liner** — Casing of small diameter extending into a producing sand from just inside the bottom of the last string of casing cemented in a well.

**Liquefied Petroleum Gas** — Mixture of light hydrocarbons, gaseous under conditions of normal temperature and pressure and maintained in the liquid state by increase of pressure.

**Liquid Fuel** — See Fuel Oil.

**Liquid Paraffin; Medicinal Oil** — Highly-refined, colourless, tasteless and odourless petroleum oil used in pharmaceutical preparations.

**Long Residue** — Residue from crude oil distillation usually containing all the lubricating oil fractions.

**Long-Time Burning Oil; Signal Oil** — Kerosine suitable for continuous burning in wick-fed lamps (especially railway signal lamps) for prolonged periods without attention.

**Lube Oil** — Term used in petroleum industry for lubricating oil.

**Lube Stock** — Term used in refineries for fractions of crude petroleum of suitable boiling range and viscosity to yield lubricating oils when further processed and treated.

**Lubricating Film** — A thin layer of lubricating oil between two solid surfaces in relative motion thus preventing their direct contact.

**Lubricating Grease** — Semi-solid lubricant consisting essentially of a stabilized mixture of oil and soap or other thickener.

**Lubricating Oil** — Oil usually refined, primarily intended to reduce friction between moving surfaces.

**Lubricating Oil Distillate** — A cut having a distillation range and viscosity such that, after refining, it yields lubricating oil.

**Lubricity** — The property of a lubricant of forming a very adherent film on the surface to be lubricated, thus preventing direct contact between them and enabling them more easily to slide over one another.

## M

**Machine Oil** — Oil used for the lubrication of the moving parts of lightly-loaded machines operating at moderate temperatures.

**Mahogany Acids** — Oil-soluble petroleum sulphonic acids.

**Marine-Engine Oil** — Oil suitable for lubricating the bearings and other contact surfaces of reciprocating marine steam engines. Such oils generally contain blown oil or other additives or both to ensure good emulsification.

**Mastic** — A bitumen preparation employed as an adhesive or waterproofing agent, for example, when bedding wood-block flooring on concrete.

**Mastic Asphalt** — A type of asphalt composed of suitably graded mineral matter and asphaltic cement in such proportions as to form a coherent, voidless, impermeable mass, solid or semi-solid under normal temperature conditions, sufficiently fluid when brought to a suitable temperature to be spread by means of a hand float.

**Mechanical Stability** — *See* Shear Stability.

**Medicinal Oil** — *See* Liquid Paraffin.

**Melting Point** — Temperature at which the product passes from the solid or semi-solid state to the liquid state under standard conditions of test.

**Mecraptans** — Foul-smelling organic hydrosulphides which occur in petroleum (for method of determination, *see* P: 36 of IS: 1448).

**Metel Deactivator** — An organic compound added to hydrocarbon distillates to suppress the catalytic action of metal compounds (especially copper) present as a result of refining or handling operations.

**Microcrystalline Wax** — Wax extracted from certain petroleum residues and having a finer and less apparent crystalline structure than paraffin wax. It is usually more opaque than paraffin wax, and may vary in hardness from soft and plastic to hard and brittle, and in colour from white to dark brown.

**Mid-boiling Point** — The temperature at which 50 percent by volume distils in the case of a petroleum fraction having a symmetrical distillation curve.

**Middle Distillate** — Any fraction of boiling range intermediate between those of gasoline and spindle oil.

**Mineral Colza; Mineral Seal; Mineral Sperm** — Highly-refined petroleum distillate, normally boiling within the limits 250° to 350°C, used as a burning oil when a high flash point (above 120°C) is required.

**Mineral Jelly** — *See* Petrolatum.

**Mineral Oil** — A mixture of hydrocarbons obtained by the treatment of materials of mineral origin.

**Mineral Seal** — *See* Mineral Colza.

**Mineral Sperm** — *See* Mineral Colza.

**Mixed Base Crude** — Crude oil in which no single type of hydrocarbon predominates.

**Mixture Response Curve** — The graphical relationship between knock-limited mean pressure or power output of an aviation gasoline and air-fuel ratio or specific fuel consumption. It indicates the degree to which knock is suppressed by enriching the mixture and the ultimate gain in output which is then made possible by increasing supercharge pressure.

**Motor Oil** — Refined lubricating oil, with or without additives, suitable for use as a lubricant in internal-combustion engines.

**Motor Spirit** — See Gasoline.

**Mould Oil** — See Form Oil.

## N

**Naphtha** — See Petroleum Naphtha.

**Naphthenates** — Alkali and other metal salts of naphthenic acids, mainly used as paint driers, and as wood and textile preservatives.

**Naphthenes** — Saturated hydrocarbon compounds in which the molecule contains at least one closed ring of carbon atoms. Also known as *cycloparaffins* or *polymethylenes*.

**Naphthenic Acids** — Organic acids, principally of monocyclic structure, which occur naturally in crude petroleum.

**Naphthenic Base Crude** — Approximately synonymous with *asphaltic base crude*.

**Natural Gas** — Gaseous hydrocarbons from underground deposits, the production of which may be associated with that of crude petroleum. The gas is described as 'wet' or 'dry' according to the proportion of entrained liquid hydrocarbons that it contains.

**Natural Gasoline; Casinghead Gasoline** — A low-boiling liquid petroleum product extracted from natural gas. In its 'wild' or unstabilized condition it contains fairly high proportions of propane and butanes. The removal of the propane yields a stabilized gasoline suitable for blending with other gasoline.

**Natural Rock Asphalt** — See Rock Asphalt.

## Neutralization Value

- a) *Acidity; Strong Acid Number* — Milligrams of potassium hydroxide required to neutralize the acidity of 1 g of a petroleum product. The value obtained may be 'organic acidity', 'inorganic acidity', 'total acidity' or 'strong acid number' according to the test conditions employed (for method of test, see P:1 or P:2 of IS:1448).

b) *Alkalinity; Strong Base Number* — The quantity of acid, expressed in terms of equivalent number of milligrams of potassium hydroxide, that is required to neutralize the strong base constituents present in 1 g of a petroleum product (for method of test, see P:1 of IS:1448).

**Neutral Oil** — Trade term originally covering distillates from Pennsylvania crude refined by clay filtration only but now applied to any finished solvent- or clay-treated distillate or lubricating oil.

**Neutron Log** — Strip recording of the secondary radioactivity arising from the bombardment of the rocks around a bore-hole by neutrons from a source being caused to move through the bore-hole. It is used generally in conjunction with other types of logs, for the identification of the fluid-bearing zones of rocks.

**Newtonian Behaviour** — The property of simple liquids by which rate of shear is proportional to the shearing stress. This constant proportion is the viscosity of the liquid.

**Nitrogen Bases** — Compounds of carbon, hydrogen and nitrogen present in certain crude oils, particularly those from California, and extractable with acid.

**NLGI Number** — A numerical scale for classifying the consistency range of lubricating greases, and based on the ASTM penetration number.

**Normal Butane** — See Butanes.

## O

**Octane Number** — Number on a conventional scale, expressing the anti-knock value of a fuel for spark-ignition engines, determined according to a standard method of test (see P:26 or P:27 of IS:1448). It is expressed as the percentage volume of *isooctane* in a mixture of *n*-heptane with *isooctane* having the same anti-knock quality as the fuel under consideration (see also Performance Number).

**Oil Gas** — Gas obtained by cracking gas oil and normally used in admix-

**Oil-in-Place** — Total volume of oil (with its dissolved gas under reservoir conditions) estimated to be present in an oil accumulation; if expressed as gas-free oil the volume is the stock-tank oil-in-place and is equal to the previous volume divided by the formation-volume factor.

**Oil Shale** — Fine-grained rock, most commonly a shale, containing a fairly high proportion of organic matter which, on destructive distillation, gives gaseous and oily or tarry products.

**Oil/Water Contact** — The oil/water contact in a reservoir rock is considered to occur at the level above which slow production gives oil without any water.

**Permeability** — A measure of the ability of a porous medium (rock) to transmit fluid. 'Specific permeability' is the permeability measured when the rock contains only one fluid. 'Effective permeability' is a measure of the ability of a rock to transmit a given fluid when the rock contains more than one fluid. 'Relative permeability' is the ratio of the effective and specific permeabilities.

**Petrol** — *See* Gasoline.

**Petrolatum; Mineral Jelly; Petroleum Jelly** — Soft, semi-solid mixture of hydrocarbons consisting essentially of microcrystalline wax associated with relatively high proportions of oil.

**Petroleum** — Mineral oil, normally a liquid mixture consisting essentially of many different hydrocarbons, occurring naturally and having a wide range of colours from yellow to black and a characteristic odour. It is the raw material from which gasoline, kerosine, lubricating oil, fuel oil, paraffin wax, bitumen and other products are obtained. In modern technical usage, the term includes gaseous and solid as well as liquid hydrocarbons.

**Petroleum Ceresin** — Hard and brittle microcrystalline wax.

**Petroleum Coke** — A blackish solid product consisting essentially of carbon, mostly obtained by thermal cracking.

**Petroleum Ether** — Special boiling point spirit of high volatility and narrow distillation range, for example, 40° to 60°C or 60° to 80°C, used in the extraction of edible oils, etc, and in laboratory analytical work.

**Petroleum Jelly** — *See* Petrolatum.

**Petroleum Naphtha** — A generic term applied to refined, partly-refined or unrefined petroleum products and liquid products of natural gas, not less than 10 percent of which distills below 175°C and not less than 95 percent of which distills below 240°C when subjected to a standard method of test.

**Petroleum Pitch** — Liquid or solid product obtained by distillation, oxidation or cracking of petroleum, having properties of agglomeration, and soluble in carbon disulphide.

**Petroleum Resins** — Solid or semi-solid resinous products obtained mainly by the distillation of special crude oils or lubricating oil extracts. They are used as substitutes for natural resins, for example, in paints.

**Petroleum Spirit** — A refined petroleum distillate boiling in gasoline range with volatility, flash point and other properties making it suitable as a thinner and solvent in paints, varnishes and similar products.

**Petroleum Sulphonic Acids** — Acids produced during the oleum or sulphur trioxide treatment of petroleum distillates in the manufacture of

medicinal, transformer and white oils (*see* Green Acids, Mahogany Acids, and Sulphonates).

**Petroleum Wax**—*See* Paraffin Wax and Microcrystalline Wax.

**Pinking**—Light knocking in an engine (*see also* Knocking Value).

**Pitch**—*See* Petroleum Pitch.

**Plasticity**—That property of an apparently solid material which enables it to be permanently deformed under the application of force, without rupture.

**Plunger Lift**—Method of raising oil in which a plunger is propelled by gas pressure up the tubing of a well, carrying above it a slug of oil. After arriving at the well-head, the plunger falls to the bottom of the tubing, the gas having been released by the operation of a valve.

**Polished Rod**—Polished steel rod passing through the stuffing box of a pumping well.

**Polymerization**—The combination, usually under controlled conditions of temperature and pressure in the presence of catalysts, of identical molecules to form more complex molecules. Such combination of molecules of similar type but different structure is called *co-polymerization*. The products obtained by the two processes are known as *polymers* and *co-polymers* respectively. Typical polymers range from light liquids to rubber-like materials.

**Pool**—Underground accumulation of petroleum in a single and separate natural reservoir.

**Potential Gum**—Residue obtained by the evaporation of a fuel which has undergone accelerated ageing under standard conditions of test (for methods of test, *see* P:28 of IS:1448).

**Pour Point**—Lowest temperature at which an oil will continue to flow when it is cooled under standard conditions of tests (for methods of test, *see* P:10 of IS:1448).

**Pour-Point Depressant**—Substance added in small proportions to a petroleum product to lower its pour point.

**Pour-Point Reversion**—The marked rise in pour-point which sometimes occurs after repeated cooling and heating of oils containing pour-point depressants.

**Power Kerosine; Vaporizing Oil**—Kerosine with a distillation range normally between 150° and 260°C and of suitable anti-knock value for use as a fuel in spark-ignition engines.

**Precipitation Naphtha**—A naphtha suitable for determination of the precipitation number of lubricating oils.

**Precipitation Number**—Millilitres of precipitate formed when 10 ml of a lubricating oil is mixed with 90 ml of ASTM precipitation naphtha and centrifuged under prescribed conditions.

**Pre-ignition**—Ignition of the carburetted air in a spark-ignition engine before the passage of the spark. It may be caused by overheated plugs or incandescant carbon.

**Pressure Distillate**—Unrefined distillate produced by cracking.

**Pressure Maintenance**—Injection of gas or water into a reservoir before there has been an extensive oil extraction and *pari passu* with oil production in order to maintain the pressure at or moderately near to the virgin value.

**Pressure Tank**—A tank specially constructed for the storage of volatile liquids under pressure. Such tanks are spheroidal, supherical, hemispherically-ended or of other special shapes.

**Primary Recovery**—Extraction of oil using only the natural forces associated with the accumulation to cause flow in the reservoir rock. Recovery of oil with oil pumps or using gas lift is also included under primary recovery.

**Producing Horizon**—Rock from which oil or gas is produced.

**Productivity Index (PI)**—The quantity of oil produced from a well (barrels per day) divided by the draw-down (pounds per square inch).

**Propane**—A saturated hydrocarbon containing three carbon atoms, gaseous at normal temperature and pressure, but generally stored and transported as a liquid under pressure. It is used for domestic heating and cooking, and for certain industrial purposes, such as metal cutting.

**Pumpability**—The ability of a lubricating grease to flow under pressure through the line, nozzle and fitting of a grease-dispensing system. It is best indicated by the apparent viscosity at moderate rate of shear.

**Pumping Jack**—Device for transmitting power to an oil-well pump.

## Q

**Quenching Oil**—Oil used for cooling metals in hardening and tempering operations.

**Quench Oil**—Oil injected into the liquid product from a cracking furnace with a view to cooling it rapidly and thus terminating the cracking reaction.

## R

**Raffinate** — Refined product resulting from a solvent extraction process (*see also* Extract).

**Ramsbottom Carbon Residue** — Carbon residue determined by Ramsbottom method of test (for method of test, *see* P: 8 of IS: 1448).

**Reboiler** — Equipment for reheating a cut which requires further fractionation in the distillation process.

**Recovery Factor** — The ratio of the recoverable oil (reserves) to the stock-tank oil-in-place in an oil reservoir. A similar factor can be used in the case of gas reserves.

**Recycle Ratio** — The ratio by volume of oil recycled to fresh feed.

**Recycling** — Continuous injection into a condensate reservoir of the dry gas produced by the treatment of condensate-bearing gas.

*or*

Any refining process in which part of the product is continuously fed back for reprocessing.

**Red Oil** — Trade term for a moderately-refined general purpose lubricating oil red in colour.

**Reduced Crude** — *See* Topped Crude.

**Reference Fuel** — Engine fuel of known octane or cetane number used as a standard in the engine testing of fuels.

**Refinery Gas** — Gas produced in the refining of crude petroleum and consisting mainly of hydrocarbons.

**Reflux** — That portion of a condensed liquid in a distillation process which is fed back to the still for revaporization.

**Reflux Ratio** — The ratio by volume of reflex to distillate drawn off as product.

**Reformate** — Liquid product from a reforming operation.

**Reformed Gasoline** — Gasoline obtained by reforming.

**Reforming** — Thermal or catalytic process for treating light petroleum fractions to yield gasoline components of different chemical structure having a higher octane number than the feedstock.

**Refrigerator Oil** — Lubricating oil of good low-temperature properties specially designed for use in refrigerators.

**Regenerator** — Plant for the reactivation of a catalyst.

**Reid Vapour Pressure**— Vapour pressure of volatile products as determined by a standard method of test (*see* P: 39 of IS: 1448).

**Research Octane Number**— Octane number determined by one of the standard methods known as 'Research method' (*see* P: 27 of IS: 1448).

**Reserves**— Amount of crude oil (or gas) expected to be recovered profitably from a given reservoir by known techniques under known or assumed economic conditions.

**Reservoir Rock**— Porous and permeable rock in which commercially important oil and gas accumulations are found (*see also* Cap Rock).

**Residue; Residuum**— Material remaining as unevaporated liquid or solid after a distillation or cracking process.

**Retrograde Condensation**— Phenomenon associated with the behaviour of a hydrocarbon mixture in the critical region wherein at constant temperature a decrease in pressure leads to separation of liquid, a reversal of usual occurrence.

**Rheoplectic Grease**— Lubricating grease which has the property of increasing in consistency (hardening appreciably) upon being subjected to shear.

**Ring Analysis**— Method of analysis for heavier hydrocarbon oils which indicates the proportions of aromatics and naphthane rings and paraffinic side chains which are present.

**Ring and Ball Test**— Method for determining the softening point of bituminous materials.

**Road Oil**— Oil or petroleum residue intended for cold application to road surfaces.

**Road Wax**— Pasty oil-wax emulsion which collects on equipment in a well when pumping waxy crudes.

**Rock Asphalt**— Naturally-occurring rock, generally calcareous but some times siliceous impregnated with bitumen.

**Rolling Oil**— Metal working oil for use in hot or cold rolling operations.

**Running On**— *See* After Running.

## S

**Salt Dome; Salt Plug**— Large pillar-like mass of salt surrounded and often overlain by sedimentary rocks which may show a domed structure.

**Sand Lenses**— *See* Shoe-String Sand.

**Saponifiable Matter** — That part of an oil which consists of substances which are decomposed on boiling with alkali (*see also* Saponification Number).

**Saponification Number** — Milligrams of potassium hydroxide consumed in neutralizing and saponifying 1 g of the material according to a standard method of test (*see* P : 55 of IS : 1448 ).

**Saturated Hydrocarbons** — Hydrocarbons which do not form direct addition compounds (*see* Naphthenes and Paraffins ) ( for method of determination, *see* P : 14 of IS : 1448 ).

**Saybolt Colour** — A number related to the depth of a column of material, the colour of which is compared with specified glass standards. The range of numbers is + 30 (lightest colour) to - 16 (darkest colour) ( for method of test, *see* P : 14 of IS : 1448 ).

**Scale Wax** — A paraffin wax, incompletely de-oiled.

**Schist** — The name given to a group of metamorphic rocks which have a tendency to split on account of the presence of folia of flaky and elongated minerals, such as mica and talc.

**Schist Oil** — Mineral oil obtained from the pyrolysis of schist.

**Schlumberger Logging** — *See* Electric Logging.

**Sealing Strength ( of Paraffin or Microcrystalline Wax )** — A characteristic defined as the force necessary to separate, under standard conditions of test, two strips of paper stuck together with paraffin or microcrystalline wax.

**Secondary Recovery** — Methods which are applied to an oil reservoir, after there has been considerable oil extraction and pressure decline, in order to increase the ultimate oil recovery beyond that which might be expected economically from the use of the original natural reservoir forces only.

**Seepage** — Naturally-occurring escape of crude oil, gas, or bitumen to the earth's surface.

**Self-Potential ( SP ) Log-Strip** — Recording of natural potentials of complex origin, arising in the immediate neighbourhood of liquid-filled boreholes (*see also* Electric Logging ).

**Sensitivity** — The difference between the octane numbers determined by the two standard methods ( Research and Motor ). It characterizes the extent to which the anti-knock quality of the gasoline varies with changes in engine speed or manifold temperature or both.

**Sett Grease** — A lubricating grease made by mixing a mineral slurry of an alkali with a mineral oil slurry of fatty acid, saponification usually being completed after the mixture is poured in the shipping container.

**Setting Point**—The temperature at which molten paraffin wax, or similar material solidifies on cooling under prescribed conditions.

**Severity Factor**—An arbitrary measure of the severity of the overall reaction conditions in processes, such as cracking, where both temperature and pressure vary.

**Shale Oil**—Distillate obtained when oil shale is heated in retorts.

**Shearing**—Slipping or sliding of one part of a substance relative to an adjacent one. In a solid, this action involves cutting or breaking of crystal structure, but in a fluid or plastic, shearing does not necessarily destroy the continuous nature of the substance.

**Shear Rate**—The rate of slip within a substance during flow. The average or mean shear rate in a pipe or tube is the average velocity divided by radius of the tube. It has dimension of reciprocal of time and is expressed in seconds<sup>-1</sup>.

**Shear Stability; Mechanical Stability**—The ability of a lubricating grease to resist changes in consistency (hardness) during mechanical working. Working may be in any of several types of laboratory machines or may be in actual service. It is also called mechanical stability.

**Shear Stress**—The force required to cause shearing in a substance. In fluids, the ratio of the shear stress to the shear rate is the viscosity of the substance.

**Shoe-String Sand; Lenticular Sands or Sand Lenses**—Irregular strip-like body of sand or sandstone which may act as a reservoir rock.

**Shooting**—Detonation of a charge of high explosive at the bottom of an oil well in order to fracture the producing formation to facilitate oil flow.

**Short Residue**—Residue from crude oil distillation containing only the more viscous part of the lubricating oil fractions.

**Signal Oil**—See Long-Time Burning Oil.

**Silver Strip Corrosion Test**—Test intended to detect corrosive products particularly of sulphur, and to estimate their degree of corrosiveness according to the changes in the appearance of a strip of electrolytic silver after it has been immersed in the sample for test under specified conditions.

**Slack Wax**—Crude paraffin wax containing a high proportion of oil and obtained by filtering a wax distillate.

**Slop Oil**—Contaminated oil which requires reprocessing.

**Sludge**—Agglomerate of solid and liquid materials with a tendency to be deposited.

**Sludge Test** — Oxidation test for transformer oil.

**Slush Pump** — Pump used to circulate drilling mud in rotary drilling.

**Smoke Point** — Maximum flame height (millimetres) at which a kerosine will burn in a lamp under prescribed conditions without producing smoke (for method of test, see P: 31 of IS: 1448).

**Soaking Chamber; Soaking Drum** — Vessel into which hot material from a cracking furnace is fed in order to allow additional time for the cracking reaction to take place before quenching and separation of the products.

**Softening Point** — The temperature at which a substance attains a particular degree of softness under prescribed conditions of test.

**Solid Lubricant** — A class of lubricants wherein the reduction of friction and wear during sliding is caused by making the shearing take place within the crystal structure of a material of low shear strength in one particular plane.

**Soluble Oil** — Oil capable of forming stable emulsions or colloidal suspensions in water, used particularly for the lubrication and cooling of cutting tools.

**Solution Gas Drive** — Oil-producing mechanism in which gas evolved from solution in the oil with pressure decline causes oil and gas to flow into a well.

**Solutizer Process** — Sweetening process for removal of mercaptans from gasoline by washing with a caustic solution containing organic compounds capable of increasing the solubility of mercaptans.

**Solvent Extraction** — Refining process by which an oil is separated into two components by extraction with a suitable liquid solvent.

**Sour** — Crude oils containing a large amount of sulphur and sulphur compounds which break down in refining to liberate troublesome quantities of corrosive sulphur compounds.

or

Gasoline, naphthas, etc, containing hydrogen sulphide and other sulphur compounds.

**Sour Gas** — A gas containing sulphur-bearing compounds, such as hydrogen sulphide and mercaptans and usually corrosive.

**Space Velocity** — The volume of feed, in a flow process, measured under standard conditions, per unit time per unit volume of reactor.

**Special Boiling Point (SBP) Spirits** — Fractions of straight-run gasoline,

usually characterized by their boiling range and intended for particular applications (*see also* Petroleum Ether).

**Specific Permeability** — *See* Permeability.

**Specific Productivity Index (SPI)** — The productivity index of a well divided by the thickness (in feet) of producing formation exposed in the well.

**Spilling Plane** — Level at which excess oil or gas will escape from certain types of trap to an adjacent trap or to the surface when the trap contains its maximum possible volume of these substances.

**Spindle Oil** — Lubricating oil of low viscosity intended for lubricating the parts of lightly loaded, high speed machines, in particular the spindles of textile machines.

**Spontaneous Ignition Temperature** — *See* Autogenous Ignition Temperature.

**Spudding-in** — The start of boring in drilling a well.

**Stabilization** — Process of separating light hydrocarbon fractions from crude petroleum or gasoline, to yield a product of lower vapour pressure.

**Stabilizer Gasoline** — A natural gasoline that has been stabilized.

**Stabilized** — A fractionating column designed to carry out the stabilization process.

**Standard Solvent** — A type of white spirit.

**Steam Cylinder Oil** — Viscous oil of high flash point, sometimes compounded with fatty oil, used to lubricate the cylinders of steam engines.

**Steam Distillation** — Type of distillation process in which steam is injected to lower the boiling point of the oils being distilled, thereby minimizing cracking.

**Steam Turbine Oil** — Oil used for the lubrication of steam turbines and having, among other properties, that of resisting the formation of stable emulsions with water.

**Stock-Tank Oil** — Term for stabilized crude petroleum (*see also* Oil-in-Place).

**Stopcocking** — Alternate opening and closing of a weak oil well to permit a build-up of gas pressure whereby the well may continue to produce without artificial lift.

**Straight Run** — Produced by distillation without cracking or alteration of the structure of the constituent hydrocarbons.

**Strapping** — Measuring the circumference of a tank with a steel strap or tape to determine its liquid capacity.

**Stripped Gas** — Natural gas or gases derived from refinery processes after removal of the more-readily condensible hydrocarbons.

**Stripping** — Removal of the more volatile components from a cut in order to raise the flash point.

or

Removal of the more-readily condensible hydrocarbons from natural or refinery gases.

**Sucker Rods** — Rods used to operate an oil-well plunger pump.

**Sulphonates** — Salts of petroleum sulphonic acids.

**Surface Tension** — The force (dynes per centimetre) with which the surface of a liquid resists enlargement of its area. This surface is usually the interface between the liquid and its vapour or air.

**Swab** — Plunger device with a valve, lowered to a point below the surface of the fluid in a well and then rapidly withdrawn to induce the oil to flow.

**Sweating (of Paraffin Wax)** — A method of reducing the oil content of slack wax by slow and progressive heat treatment.

**Sweet Crude** — Crude petroleum containing little sulphur and with no offensive odour.

**Sweetening** — Process for improving the odour of a light petroleum distillate by converting mercaptans into disulphides. Before treatment, the distillate is termed sour and after treatment sweet. The main chemicals used for this purpose are sodium hypochlorite, sodium plumbite (*see* Doctor Treatment) and copper chloride.

**Sweet Gasoline** — Gasoline containing negligible amounts of hydrogen sulphide and mercaptans and so gives a negative reaction to the Doctor Test.

**Syneresis** — Loss of liquid lubricant from a lubricating grease due to shrinkage or rearrangement of the structure. The shrinkage may be due to either physical or chemical changes in the thickener. Syneresis is a form of bleeding.

**Synthetic Thickener** — Any of the several specially treated or synthetic materials excepting the metallic soaps of long chain fatty acids, which can be either mechanically or thermally dispersed in liquid lubricants.

## T

**Tail End** — That portion of an oil which vaporizes near the end of distillation (the heavy end).

**Tank Bottoms**—The oil in a tank below the level of the outlet pipe.

**Tank Sludge**—See Sludge.

**Tempering Oil; Heat Treatment Oil**—Heavy oil used for maintaining metals at a predetermined temperature during tempering operations.

**Tetraethyl Lead**—Organo-metallic anti-knock compound having the chemical formula  $\text{Pb}(\text{C}_2\text{H}_5)_4$ . In practice, tetraethyl lead is used in conjunction with halogenated products (for method of determination, see P:37 or P:38 of IS: 1448).

**Textile Oils**—Oils used in the textile industries for processing of fibres or lubrication of machinery (see *Batching Oil*).

**Texture**—That property of a lubricating grease which is observed when a small separate portion of it is pressed together and slowly drawn apart. It should be described in the following terms:

- a) *Brittle*—having a tendency to rupture or crumble when compressed,
- b) *Buttery*—separates in short peaks with no visible fibres,
- c) *Long Fibre*—shows tendency to stretch or string out into a single bundle of fibres,
- d) *Short Fibre*—shows short break-off with evidence of fibres, and
- e) *Stringy*—shows tendency to string out long fine thread without visible fibre structure.

**Thermal Cracking**—Process whereby the relative proportions of lighter or more volatile products obtainable from an oil may be increased by bringing about changes in the chemical structure of the constituent hydrocarbons. In thermal cracking, the change is brought about by temperature and pressure alone.

**Thermal Value**—See Calorific Value.

**Thickening Agent**—The solid particles which are relatively uniformly dispersed to form the structure of lubricating grease in which the liquid is held by surface tension and other physical forms (see also *Synthetic Thickener*).

**Thief**—A standard device which permits taking a sample from a predetermined location in the body of oil to be sampled.

**Thixotropy**—The property which is manifested by a decrease in consistency or softening as a result of shearing, followed by an increase in consistency or hardening, beginning after shearing is stopped. This term is used in lubricating grease and other similar materials.

**Toluole**—Commercial aromatic fraction from coal tar boiling at approximately  $110^\circ\text{C}$  and consisting essentially of toluene together with minor quantities of benzene and xylene.

**Topped Crude**—Crude oil from which some of the lighter constituents have been removed by distillation.

**Topping Plant**—Distillation equipment employed for the removal of the more volatile fractions of an oil.

**Tops**—Light fractions of crude petroleum removed by distillation in a topping plant (*see also* Topped Crude).

**Transformer Oil**—Pale petroleum distillate of low viscosity used for cooling and insulating transformers.

**Trap**—Vessel or pond in which spilled petroleum or leakage from a refinery collects.

or

Part of a reservoir rock which by virtue of its form and the nature of the adjacent rocks is capable of retaining oil or gas in commercial quantities.

**Triptane**—2, 2, 3-Trimethylbutane. A hydrocarbon compound made commercially in small quantities, one of the highest anti-knock petroleum fuels known.

**True Boiling Point Distillation**—Type of laboratory distillation employing a fractionating column which accomplishes a good degree of fractionation of a petroleum product.

**Tubing Pressure**—Pressure measured at the top of a well in the tubing through which oil and gas can flow in the course of production.

**Turbine Oil**—Petroleum oil used for the lubrication of steam and other turbines.

## U

**Ullage**—Empty space above the liquid level in a tank or a container up to the reference point (*see* Ullage Reference Point).

**Ullage Reference Point**—A point clearly marked on the ullage hatch or an attachment suitably located above or below the ullage hatch and situated at a fixed and known distance greater than the maximum liquid depth above the bottom of a container.

**Unsaturated Hydrocarbons**—Hydrocarbons which readily form direct addition compounds.

**Unstabilized Natural Gasoline**—Gasoline extracted from natural gas and containing in solution appreciable quantities of gaseous hydrocarbons, such as butane and lighter hydrocarbons.

**Unsulphonated Mineral Residue**—That portion of an oil which does not react with concentrated sulphuric acid under prescribed conditions.

**Used Oil**—Lubricating oil that has deteriorated after use due to the presence of oxidation products, combustion residues, metallic particles, etc.

## V

**Vaporizing Oil**—*See* Power Kerosine.

**Vapour Lock**—Excessive accumulation of gasoline vapour which stops the flow of fuel to an engine.

**Vapour Pressure**—That part of the pressure in an enclosed space containing a particular substance, which is due to the vapour of the substance. It is a measure of the tendency of the substance to evaporate. It increases as the temperature rises, and when it becomes equal to atmospheric pressure, the substance, if it is a liquid under atmospheric pressure, boils (for determination by Reid method, *see* P: 39 of IS: 1448).

**Vapour-Tight Tank**—A tank of conventional shape intended primarily for the storage of volatile liquids, for example, gasoline, and so constructed that it will withstand pressures differing only slightly from atmospheric. Such tanks are equipped with special devices which permit gauging without opening the tanks to atmosphere.

**Varnish Makers' and Painters' (VM & P) Naphtha**—A petroleum naphtha with a narrow boiling range used as a thinner in paints and varnishes.

**Visbreaking; Viscosity Breaking**—Lowering or breaking the viscosity of a heavy residue by cracking at relatively low temperature. It can also be achieved by injecting the residuum into the hot-cracked products from thermal cracking operations as they leave the cracking furnace.

**Viscosity**—Property of a fluid characterized by the resistance which it offers when it is flowing, to the relative movement of its molecules (*see also* Absolute Dynamic Viscosity and Absolute Kinematic Viscosity).

**Viscosity Breaking**—*See* Visbreaking.

**Viscosity Gravity Constant**—The general relationship between specific gravity at 60°F and Saybolt universal viscosity at 100°F shown by an empirical equation. It is used mainly as an index of the chemical composition of lubricating oil.

**Viscosity Index**—Number used conventionally to characterize the variation of the viscosity of an oil with temperature. A low viscosity index indicates a relatively large change of viscosity with temperature and vice versa (for method of determination, *see* P: 56 of IS: 1448).

**Viscosity Index Improver**—Additives incorporated in small proportion to a lubricating oil to raise its viscosity index.

W

**Wash Oil** — See Absorption Oil.

**Water and Sediment** — The whole of the phase consisting of water and solid matter in suspension separated by a standard centrifuge test (for method of test, see P:41 of IS:1448).

**Water Bottoms** — Water accumulated at (or sometimes added to) the bottom of the oil in a storage tank.

**Water Dip** — The depth of water in a container or tank.

**Water Drive** — Producing mechanism in which oil is driven to a well by advance of water into the zone originally occupied by the oil.

**Water Finder** — Instrument for ascertaining the level of water in a tank containing oil.

**Wax Distillate** — A fraction of crude petroleum from which paraffin wax can be extracted.

**Wax Tailings** — Viscous oil fractions containing soft non-crystalline wax, obtained at high temperatures near the end of the distillation of certain crude oils.

**Weathered Crude Petroleum** — The product resulting from crude petroleum through loss, due to natural causes during storage and handling, of an appreciable quantity of the more volatile components.

**Weathering** — Loss of light petroleum fractions by exposure of an oil or bitumen to the atmosphere. In some cases oxidation and polymerization may also occur.

**Wet Gas** — Natural gas containing significant amount of condensable hydrocarbons.

**Wetting Agent** — Substance added in small proportion to increase the rate at which a liquid spreads over a surface or penetrates a porous or fibrous material.

**Whipstock** — A device used to deflect the direction of a bore-hole.

**White Oils** — Highly refined oils, practically colourless.

**White Scale** — See Paraffin Scale.

**White Spirit** — Refined distillate with a distillation range of about 150° to 200° C.

**Wiese Formula** — An empirical formula for expressing motor fuel anti-knock values above 100 in relation to performance number. The formula

was the basis for the scale the ASTM has proposed in which octane number values above 100 are related to increment of tetraethyl lead added to *isooctane*.

**Wildcat**—Well drilled in search of a new oil or gas accumulation.

**Wild Gasoline**—*See* Natural Gasoline.

**Wool Oil**—A compounded mineral oil used in the manufacture of woollen cloth to lubricate the wool fibre so that it will suffer minimum degradation in staple length and will spin easily.

**Working**—Subjecting lubricating grease to any form of agitation or shearing action.

## X

**Xylole**—Commercial aromatic fraction from coal tar, boiling at approximately 140° to 160°C, and consisting mainly of xylene with small quantities of other aromatics.

## Y

**Yellow Scale**—Trade name for low-grade paraffin wax.

**Yield Stress**—The minimum stress required to produce flow of a plastic material. It is estimated by the intercept on the shear stress axis of the shear stress-shear rate curve, by extrapolation of the straight portion of the curve.

# INTERNATIONAL SYSTEM OF UNITS ( SI UNITS )

## Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

## Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

## Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg.m/s <sup>2</sup>
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m <sup>2</sup>
Frequency	hertz	Hz	1 Hz = 1 c/s ( s <sup>-1</sup> )
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m <sup>2</sup>

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